

**CLAIMS**

1. A rotary machine having a rotor, a stator, and  
blade rows on the rotor and stator that impart a high swirl  
5 component to gases flowing through the machine so that the  
denser impurities are deflected radially outwards by  
centripetal action onto the inner wall of the stator of the  
machine, wherein a guide surface is provided on the inner  
wall of the stator along which any impurities separated by  
10 the centripetal action from the main gas stream are  
entrained by the main gas stream and guided to flow from the  
gas intake side to the gas outlet side of the machine, the  
guide surface being radially stepped to resist only reverse  
flow of the separated impurities back towards the gas intake  
15 side of the machine and being operative at the downstream  
end of the machine to discharge the separated impurities  
back into the main gas stream for the impurities to exit  
from the machine with the main gas stream.

20 2. A rotary machine as claimed in claim 1, wherein  
the guide surface is rotationally symmetrical about the axis  
of the rotor.

25 3. A rotary machine as claimed in claim 1, wherein  
the guide surface is formed by at least one groove in the  
inner wall of the stator that only extends around part of  
the circumference of the stator.

30 4. A rotary machine as claimed in claim 3, wherein  
the groove is arranged at the lower end of the stator such  
that separated impurities collect in the groove by the  
action of gravity.